CLAIMS

What is claimed is:

1. A method of administering live cells to a patient in need thereof comprising injecting into a treatment site of the patient an effective amount of a composition comprising biocompatible, biodegradable polymer microparticles and live cells, wherein said cells provide a therapeutic effect in the patient.

2. The method of Claim 1 wherein the therapeutic effect comprises the generation of new tissue at the treatment site.

3. The method of Claim 2 wherein the live cells are selected from cartilage producing cells, organ cells, fibroblasts, osteoblasts, nerve cells, smooth muscle cells, skeletal muscle cells, and Schwann cells.

4. The method of Claim 2 wherein the cells are chondrocytes.

5. The method of Claim 4 wherein the new tissue is cartilage tissue.

6. The method of Claim 5 wherein the treatment site is into the articular space of a joint of the patient.

7. The method of Claim 1 wherein the therapeutic effect is the secretion of a biologically active secretory molecule.

8. The method of Claim 7 wherein the biologically active secretory molecule is selected from hormones, cytokines, growth factors, trophic factors, angiogenesis

factors, antibodies, blood coagulation factors, lymphokines, enzymes and agonists, precursors, active analogs or active fragments thereof.

9. The method of Claim 8 wherein the biologically active secretory molecule is the hormone insulin.

10. The method of Claim 9 wherein the live cells are pancreatic islet cells.

11. The method of Claim 8 wherein the biologically active secretory molecule is dopamine.

12. The method of Claim 11 wherein the live cells are selected from PC-12 cells, adrenal chromaffin cells and fetal nigral primordia cells.

13. The method of Claim 1 wherein the the biocompatible, biodegradable polymer of the microparticle is selected from poly(lactides), poly(glycolides), poly(lactide-co-glycolides), poly(lactic acid)s, poly(glycolic acid)s, polycarbonates, polyesteramides, polyanydrides, poly(amino acids), polyorthoesters, poly(dioxanone)s, poly(alkylene alkylate)s, copolymers of polyethylene glycol and polyorthoester, polyurethanes, blends thereof, and copolymers thereof.

14. The method of Claim 13 wherein the biocompatible, biodegradable polymer is a poly(lactide-co-glycolide).

15. The method of Claim 1 wherein the composition further comprises a pharmaceutically acceptable carrier.

16. The method of Claim 1 wherein the composition further comprises a biologically active agent.

17. The method of Claim 16 wherein the biologically active agent has tissue regeneration inductive properties.

18. The method of Claim 17 wherein the biologically active agent is a growth factor or differentiating factor.

19. The method of Claim 18 wherein the growth factor is selected from basic fibroblast growth factor (bFGF), platelet-derived growth factors (PDGF), transforming growth factors (TGF-α, TGF-β), cementum growth factors, epidermal growth factor (EGF), hepatocyte growth factor, heparin binding factor, insulin-like growth factors I or II (IGF-I, IGF-II), erythropoietin, and nerve growth factor (NGF).

20. The method of Claim 18 wherein the differentiating factor is a morphogenic protein.

21. The method of Claim 20 wherein the morphogenic protein is selected from OP-1, OP-2, OP-3, BMP2, BMP3, BMP4, BMP5, BMP6 and active fragments and derivatives thereof.

22. The method of Claim 1 wherein the concentration of cells in the composition is from about 0.5 x 10^6 cells/mL to about 50 x 10^6 cells/mL.

23. A method of generating new cartilage tissue in a patient in need thereof comprising administering by injection to a treatment site of the patient a

composition comprising live chondrocytes and biocompatible, biodegradable polymer microparticles.

24. The method of Claim 23 wherein the the biocompatible, biodegradable polymer of the microparticle is selected from poly(lactides), poly(glycolides), poly(lactide-co-glycolides), poly(lactic acid)s, poly(glycolic acid)s, polycarbonates, polyesteramides, polyanydrides, poly(amino acids), polyorthoesters, poly(dioxanone)s, poly(alkylene alkylate)s, copolymers of polyethylene glycol and polyorthoester, polyurethanes, blends thereof, and copolymers thereof.

25. The method of Claim 24 wherein the biocompatible, biodegradable polymer is a poly(lactide-co-glycolide).

26. The method of Claim 23 wherein the composition further comprises a pharmaceutically acceptable carrier.

27. The method of Claim 23 wherein the composition further comprises a biologically active agent.

28. The method of Claim 27 wherein the biologically active agent has tissue regeneration inductive properties.

29. The method of Claim 28 wherein the biologically active agent is a growth factor or differentiating factor.

30. The method of Claim 29 wherein the growth factor is selected from basic fibroblast growth factor (bFGF), platelet-derived growth factors (PDGF), transforming growth factors (TGF-α, TGF-β), cementum growth factors,

epidermal growth factor (EGF), hepatocyte growth factor, heparin binding factor, insulin-like growth factors I or II (IGF-I, IGF-II), erythropoietin, and nerve growth factor (NGF).

31. The method of Claim 29 wherein the differentiating factor is a morphogenic protein.

32. The method of Claim 31 wherein the morphogenic protein is selected from OP-1, OP-2, OP-3, BMP2, BMP3, BMP4, BMP5, BMP6 and active fragments and derivatives thereof.

33. The method of Claim 23 wherein the concentration of cells in the composition is from about 0.5×10^6 cells/mL to about 50×10^6 cells/mL.

34. A method of generating new internal organ tissue in a patient in need thereof comprising administering by injection to a treatment site of the patient a composition comprising live internal organ cells and biocompatible, biodegradable polymer microparticles.

35. The method of Claim 34 wherein the treatment site is an organ of the patient, wherein the organ and administered cells are of the same tissue type.

36. The method of Claim 35 wherein the live internal organ cells are selected from heart cells, lung cells, kidney cells, liver cells, pancreatic cells and brain cells.

37. A method for treating diabetes in a patient in need of treatment comprising administering to the patient by injection into a treatment site an effective amount of a composition comprising biocompatible, biodegradable polymer microparticles and live pancreatic islet cell, wherein said cells secrete insulin.

38. The method of Claim 37 wherein the treatment site is the pancreas of the patient.

39. A method of generating new cartilage tissue having a specified anatomical shape comprising placing a composition comprising live cells and a biocompatible, biodegradable polymer microparticle in a cell culture chamber having the specified anatomical shape and sintering the composition.

40. The method of Claim 40 wherein the live cells are chondrocytes.

41. The method of Claim 40 wherein the the biocompatible, biodegradable polymer of the microparticle is selected from poly(lactides), poly(glycolides), poly(lactide-co-glycolides), poly(lactic acid)s, poly(glycolic acid)s, polycarbonates, polyesteramides, polyanydrides, poly(amino acids), polyorthoesters, poly(dioxanone)s, poly(alkylene alkylate)s, copolymers of polyethylene glycol and polyorthoester, polyurethanes, blends thereof, and copolymers thereof.

42. The method of Claim 41 wherein the biocompatible, biodegradable polymer is a poly(lactide-co-glycolide).

43. A composition comprising biocompatible, biodegradable polymer microparticles and live cells.

44. The composition of Claim 43 wherein the biocompatible, biodegradable polymer of the microparticle is selected from poly(lactides), poly(glycolides), poly(lactide-co-glycolides), poly(lactic acid)s, poly(glycolic acid)s, polycarbonates, polyesteramides, polyanydrides, poly(amino acids), polyorthoesters, poly(dioxanone)s, poly(alkylene alkylate)s, copolymers of

polyethylene glycol and polyorthoester, polyurethanes, blends thereof, and copolymers thereof.

45. The composition of Claim 44 wherein the biocompatible, biodegradable polymer is a poly(lactide-co-glycolide).

46. The composition of Claim 43 wherein the live cells generate tissue.

47. The composition of Claim 46 wherein the live cells are chondrocytes.

48. The composition of Claim 46 wherein the live cells are hepatocytes.

49. The composition of Claim 43 wherein the live cells secrete a biologically active secretory molecule.

50. The composition of Claim 49 wherein the live cells are pancreatic islet cells.

51. The composition of Claim 49 wherein the live cells are dopaminergic cells.

52. The composition of Claim 51 wherein the cells are selected from PC-12 cells, adrenal chromaffin cells and fetal nigral primordia cell.

53. The composition of Claim 43 wherein the composition further comprises a pharmaceutically acceptable carrier.

54. The composition of Claim 43 wherein the composition further comprises a biologically active agent.

55. The composition of Claim 54 wherein the biologically active agent has tissue regeneration inductive properties.

56. The composition of Claim 55 wherein the biologically active agent is a growth factor or differentiating factor.

57. The composition of Claim 56 wherein the growth factor is selected from basic fibroblast growth factor (Bfgf), platelet-derived growth factors (PDGF), transforming growth factors (TGF-α, TGF-β), cementum growth factors, epidermal growth factor (EGF), hepatocyte growth factor, heparin binding factor, insulin-like growth factors I or II (IGF-I, IGF-II), erythropoietin, and nerve growth factor (NGF).

58. The composition of Claim 56 wherein the differentiating factor is a morphogenic protein.

59. The composition of Claim 58 wherein the morphogenic protein is selected from OP-1, OP-2, OP-3, BMP2, BMP3, BMP4, BMP5, BMP6 and active fragments and derivatives thereof.

60. The composition of Claim 43 wherein the concentration of cells in the composition is from about 0.5×10^6 cells/mL to about 50×10^6 cells/mL..